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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,528	06/25/2001	Michael A. Ekhaus	2222.0730001	5737

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1100 NEW YORK AVENUE, N.W.  
WASHINGTON, DC 20005

EXAMINER
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STERRETT, JONATHAN G

ART UNIT	PAPER NUMBER
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3623

MAIL DATE	DELIVERY MODE
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10/13/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/887,528	<b>Applicant(s)</b> EKHAUS ET AL.	
	<b>Examiner</b> JONATHAN G. STERRETT	<b>Art Unit</b> 3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 6-29-09.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19,27 and 35-44 is/are pending in the application.
- 4a) Of the above claim(s) 9,10,19,27 and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8,11-18 and 36-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 June 2009 has been entered.

2. This **Non-Final Office Action** is responsive to 29 June 2009. **Currently Claims 1-8, 11-18, 36-44** are rejected below. **Claims 9, 10, 19, 27 and 35** are withdrawn. **Claims 20-26 and 28-34** are cancelled.

### ***Response to Arguments***

3. Applicant's arguments have been fully considered, but are moot in view of new grounds of rejection. The examiner notes that the 35 USC 101 rejection is withdrawn in response to the amendments.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-7, 11-17 and 36-44** are rejected under 35 U.S.C. 103(a) as being unpatentable over “Learning collaborative information filters” D **Billsus**, MJ Pazzani - Proceedings of the Fifteenth International Conference ..., 1998 - aaai.org (hereinafter **Billsus**).

As per claim 1, Billsus discloses a method of preparing a recommendation to be accessed by a user comprising the steps of:

**generating a sparse unary ratings matrix from the user's selected preferences, wherein said user's selected preferences are represented as unary data in said sparse unary ratings matrix, wherein each unary data entry has a value of either zero or one**

page 3 column 1 under "Collaborative Filtering and the SVD", a sparse unary matrix is generated from user's expressed preferences – this is a sparse matrix since it is mostly zeros and uses a 1 or a zero (i.e. is a unary matrix) to indicate the user has expressed a preference.

**forming a plurality of data structures representing said sparse ratings matrix**

The initial matrix A is decomposed in matrices U, V and Sigma (i.e. representing the data structures. The equation shows that the initial sparse unary matrix A is decomposed into the U, V and Sigma data structures (i.e. vectors or matrices)

**forming a runtime recommendation model from said plurality of data structures**

**determining a recommendation from said runtime recommendation model**

**providing said recommendation in response**

page 4 under “experimental methodology”, the model is trained to form a recommendation (i.e. a runtime recommendation model) of types of movies that users may like

Billsus’ approach is to classify users according to expressed likes and dislikes for a particular movie. Billsus uses the expressed preference of a single user to classify that user (i.e. put that user in a group where other members of the group have similar expressed preferences). The classification is a recommendation in that it recommends that a user be put in a particular group.

Billsus does not teach receiving a request per se to determine a recommendation (i.e. a particular classification or segmentation) however Billsus does teach performing the classification for each user (see under experimental methodology) - this classification puts the user in a group of items where expressed preferences are similar – the “suggestion” of classification by Billsus is a recommendation). Billsus does suggest using the algorithm taught to be machine implemented (i.e. a machine-learning algorithm). This automation suggests setting up the algorithm so that a request can be received to classify a particular user. Official Notice is taken that using collaborative

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filtering techniques such as taught by Billsus can be used to receive requests and provide output. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Billsus regarding validating the use of a classification model that provides collaborative filtering using a unary matrix to automate the algorithm to provide collaborative filtering recommendations because it would have provided the well known advantages of automating the algorithm using a machine (i.e. to receive a request and provide recommendations) and would also have provided a predictable result in combination with the teachings of Billsus which suggest automating the algorithm since it is suggested it be automated using a machine (i.e. a computer).

As per claim 2, Billsus discloses the method of claim 1, further comprising **calculating a unary multiplicity voting recommendation from said runtime recommendation model**

Page 4, "summary of results". The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

As per claim 3, Billsus discloses the method of claim 1, further comprising **calculating a non-unary multiplicity voting recommendation from said runtime recommendation model.**

Page 4, "summary of results". The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

As per claim 4, Billsus discloses the method of claim 2, wherein said **calculating a unary multiplicity voting recommendation comprises calculating an anonymous recommendation**

Page 4, “summary of results”. The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

As per claim 5, Billsus discloses the method of claim 2, **wherein calculating a unary multiplicity voting recommendation comprises calculating a personalized recommendation**

Page 4, “summary of results”. The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

As per claim 6, Billsus discloses the method of claim 3, **wherein calculating a non-unary multiplicity voting recommendation comprises calculating an anonymous recommendation**

Page 4, “summary of results”. The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

As per claim 7, Billsus discloses the method of claim 3, wherein calculating a **non-unary multiplicity voting recommendation comprises calculating a personalized recommendation**

Page 4, “summary of results”. The classification or suggestion of classification (i.e. a recommendation) is calculated as a result of the SVD algorithm.

**Claims 11-17 and 36-44** recite subject matter similar to the limitations already rejected above in **claims 1-7**. Therefore, **claims 12-17 and 36-41** are rejected on the same basis as **claims 1-7** above.

Additionally, with regard to independent claims 36 and 41, Billsus discloses applying the sparse vectors/arrays (i.e., the user profiles and the item profiles) to several numbers of recommendation models that use zero and non-zero entries, thereby using a first recommendation model and a second recommendation model (col. 3, lines 34-57; col. 19, lines 50-50; col. 20).

6. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billsus and Schwinger, Julian, “The Geometry of Quantum States,” Feb. 15, 1960.



As per claim 8, Billsus discloses wherein forming a runtime recommendation model from said plurality of data structures comprises: mapping each rated item in the sparse unary ratings matrix to a category (page 3 column 1, the features in the individual matrices represent the items that are rated).

Billsus does not expressly disclose wherein said mapping step comprises multiplying said unary ratings matrices by a mappings matrix between said unary ratings matrices and a plurality of categories.

Schwinger discloses multiplying matrices by a mappings matrix in order to map the matrices to that matrix (middle of page 260, “The product of an operator with a vector expresses a mapping upon another vector in the same space...”). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Billsus to use matrix multiplication as disclosed in Schwinger to map the rated items in the sparse unary ratings matrix to a category because doing so is a standard way in the art to map matrix data and also, because using a mathematical formula to map the matrix provides an efficient and effective means for mapping data, thereby enhancing Billsus’s current means of mapping data.

Claim 18 recites subject matter similar to the limitations already rejected above in claim 8. Therefore, claim 18 is rejected on the same basis as claim 8 above.

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7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. .

The sparse matrix manipulation system: User and reference manual

FL Alvarado - URL address: <http://www.cs.indiana.edu/ftp/> ..., 1993 - Citeseer

An efficient cluster identification algorithm.

A Kusiak, WS Chow - IEEE transactions on systems, man, and cybernetics, 1987

- [hkbu.edu.hk](http://hkbu.edu.hk)

A framework for collaborative, content-based and demographic filtering-

► [psu.edu](http://psu.edu) [PDF]

MJ Pazzani - Artificial Intelligence Review, 1999 – Springer

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G Sterrett whose telephone number is 571-272-6881. The examiner can normally be reached Monday – Friday from 8:30am to 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beth Boswell, can be reached at 571-272-6737.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/JGS/

10-8-09

/Jonathan G. Sterrett/

Primary Examiner, Art Unit 3623